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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,752	08/01/2003	Frank-Michael Kamm	P2002,0645	4660

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EXAMINER

ROSASCO, STEPHEN D

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 03/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/632,752

Applicant(s)

KAMM ET AL.

Examiner

Stephen Rosasco

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 8/1/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Detailed Action

Applicant's election without traverse of Group II (claims 11-18) in the reply filed 1/24/05 is acknowledged.

The disclosure is objected to because of the following informalities: page 10, line 1 and claim 11, last paragraph "doped with a doping". Also the last part, and especially the last line, is not particularly clear: "and said oxide layer including a region having a layer thickness with the same doping as said doping of said capping layer being incorporated into an oxide of said oxide layer."

Appropriate correction is required.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghandehari et al. (US 6,673,524) in view of (Wagener US 20050048800 A1).

The claimed invention is directed to a reflective optical mirror for the lithographic exposure of semiconductor products, the mirror comprising: a substrate; a multilayer structure disposed above said substrate for reflecting electromagnetic radiation through constructive interference; and a capping layer disposed above said multilayer structure, said capping layer formed of a material on which a natural oxide layer forms in air, said material of said capping layer being doped and said oxide layer including a region having a layer thickness with the same doping layer.

And wherein said layer thickness of said oxide layer is between 0.8 and 2.0 nm.

And wherein said capping layer is formed of n-doped silicon.

And wherein said capping layer is doped with a material selected from the group consisting of phosphorus and arsenic.

Ghandehari et al. teach a method of forming an attenuating extreme ultraviolet (EUV) phase-shifting mask, the method comprising: providing a multi-layer mirror over an integrated circuit substrate or a mask blank; providing a buffer layer over the multi-layer mirror; and providing a dual element material layer over the buffer layer by selectively growing features above the integrated circuit substrate or mask blank using a photon assisted chemical vapor deposition (CVD) process.

Ghandehari et al. (col. 8, lines 20-33) also teach that instead of etching out the trench, oxide material, such as SiO_2 , is grown selectively by photon assisted CVD on one side until the necessary thickness is achieved.

The teachings of Ghandehari et al. differ from those of the applicant in that the applicant teaches the use of a capping layer disposed above said multilayer structure, said capping layer formed of a material on which a natural oxide layer forms in air, said material of said capping layer being doped and said oxide layer including a region having a layer thickness made using peroxide.

Wagener (see esp.[0026] to [0030]) teaches methods of making oxide layers, preferably ultrathin oxide layers, with a high level of uniformity. One such method includes the steps of forming a substantially saturated or saturated oxide layer directly or indirectly on a semiconductor surface of a semiconductor substrate, and etchingly reducing the thickness of the substantially saturated or saturated oxide layer by an amount such that the etched oxide layer has a thickness less than the substantially saturated or saturated oxide layer.

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Wagener discusses similar problems with oxide growth such as those discussed by the applicant, and the step of chemically growing oxide. SCl chemistry typically involves using an aqueous solution of hydrogen peroxide and ammonia.

It would have been obvious to one having ordinary skill in the art to take the teachings of Ghandehari et al. and combine them with the teachings of Wagener in order to make the claimed invention because the formation of the uniform oxide film that is thick enough to slow the increased production of oxide on the surface is the thrust of the invention and this is taught in the prior art to a reflection mask.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, sweeping flourish extending from the end.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
03/21/05